Answer Key

1. A
2. E
3. A
4. B
5. C
6. A
7. C
8. D
9. E
10. C
11. C
12. D
13. C
14. B
15. C
16. D
17. B
18. B
19. C
20. D
21. D
22. B
23. B
24. C
25. C
26. C
27. B
28. D
29. A
30. A
31. C
32. C
33. D
34. B
35. B
36. D
37. D
38. B
39. B
40. B

Question 1

(i) Explain what is the principal-agent problem in corporate finance and describe (in one paragraph each) three ways to deal with it. Make sure to explain the advantages and, most importantly, the disadvantages of each of the three solutions.

Answer: The principal-agent problem in corporate finance is related to the fact that the interests of the principal (the manager of a company) and the agents (the shareholders in the company) do not coincide. In other words, managers tries to reach their own goals (e.g., higher wages), which is not usually what they were hired for (higher profits). Ways to mitigate this problem include:

(1) *compensation plans in the form of stock or stock options* – managers are getting paid partly in the form of stock in the company. This would make them interested in the good (short-term) performance of the company. The problem is that this creates incentives for them to "cook the books" so that the company looks good even if in reality it does not.

(2) *board of directors* – group of shareholders that are paid to monitor the actions of the manager. This would ensure better monitoring of the actions and presumably induce a better performance from managers. The problem is that, since the managers are being paid to monitor, they become agents as well and they might pursue their interests rather than the shareholders'.

(3) *outside analysts* – having outside analysts monitor and rate the performance of managers saves the shareholders the trouble of having to do that themselves and should induce better actions from the managers. Still, analysts might have vested interests with the manager, which would lead to inaccurate reports.

(4) *takeover threats* – managers whose companies are threatened to be taken over tend to perform better so that they have a better chance the new owners would not oust them. This is not really in the power of the shareholders though, even if they can threaten to unite (through proxy voting) and elect a person in the board that would oust the poorly performing manager.

(ii) The evolution of the stock market is shown in the table below:

	Year 0		Year 1	
	Price	No. of shares	Price	No. of shares
Stock A	63	150	26	450
Stock B	42	370	38	370
Stock C	18	230	20	230

Calculate the price-weighted index for years 0 and 1, and the value-weighted index for year 1 given a value of $1,000$ points of the value-weighted index in year 0.

Answer: The value of the *price-weighted index in year 0* is

$$\boxed{I_0^p = \frac{63 + 42 + 18}{3} = \frac{123}{3} = 41.}$$

To calculate the value of the price-weighted index in year 1, note that the number of shares of stock A changes from 150 to 450 (the number of shares for the other two stocks is unchanged). This means that there was a stock split, and shares of stock A split 3-for-1 (since the number of shares increased by a factor of $450/150 = 3$). Thus, we need to calculate the *divisor*:

$$\frac{\frac{63}{3} + 42 + 18}{d} = 41 \quad \Rightarrow \quad \boxed{d = \frac{\frac{63}{3} + 42 + 18}{41} = \frac{21 + 42 + 18}{41} = \frac{81}{41} = 1.976.}$$

Now we can calculate the *price-weighted index in year 1*:

$$\boxed{I_1^p = \frac{26 + 38 + 20}{d} = \frac{84}{1.976} = 42.52.}$$

The *value-weighted index in year 1*, based on a value of $1,000$ points for year 0, is

$$\boxed{I_1^v = \frac{26 \cdot 450 + 38 \cdot 370 + 20 \cdot 230}{63 \cdot 150 + 42 \cdot 370 + 18 \cdot 230} \cdot 1,000 = \frac{30360}{29130} \cdot 1,000 = 1,042.22 \text{ points.}}$$